

Four new rare species of *Sauropus* Blume (Euphorbiaceae: Phyllanthae) from north Queensland

John T.Hunter and Jeremy J.Bruhl

Summary

Hunter, J.T. & Bruhl, J.J. (1997). Four new rare species of *Sauropus* Blume (Euphorbiaceae: Phyllanthae) from north Queensland. *Austrobaileya*. 4(4): 661–672. *Sauropus anemoniflorus* J.T.Hunter & J.J.Bruhl, *S. aphyllus* J.T.Hunter & J.J.Bruhl, *S. convallarioides* J.T.Hunter & J.J.Bruhl and *S. decrescentifolia* J.T.Hunter & J.J.Bruhl are described and notes are provided on their distribution, habitat and conservation status. A key to the Queensland species of *Sauropus* is also provided.

Keywords: *Sauropus*, *Sauropus anemoniflorus*, *S. aphyllus*, *S. convallarioides*, *S. decrescentifolia* – Phyllanthae - north Queensland.

John T.Hunter & Jeremy J.Bruhl, Department of Botany, University of New England, Armidale, NSW 2351, Australia

Introduction

The genus *Sauropus* Blume has had a tortuous history. In Australia, it is only relatively recently that the genus has been accepted. Previously, most species conforming to the circumscription of this genus have been placed in various genera including *Synostemon* F.Muell., *Glochidion* Forster & G.Forster, *Diasperus* Kuntze and, most commonly, *Phyllanthus* L., (see Bentham 1873; Webster 1956; Eichler 1965; Stanley 1983). Blume described the genus in 1825 (Blume 1825), but in Australia it appears to have been accepted only after Airy Shaw (1980) renamed various Australian species of *Phyllanthus* and *Synostemon* under *Sauropus*.

During our revision of *Sauropus* for the *Flora of Australia* project, four new and rare species have been identified. These are endemic in north Queensland. This paper presents full descriptions of these species along with notes on their distribution, habitat and conservation status.

Methods

Sampling and Organisation of Data

Significant proportions of the *Sauropus* specimens held by the herbaria AD, BRI, CANB,

DNA, HO, MEL, NSW, PERTH and QRS, and historically important *Sauropus* specimens from A and GH were provisionally sorted into taxa. Close inspection of these taxa and subsequent re-sorting of specimens formed the basis for our decisions on the status of these taxa. Ten representative specimens (where available) of these taxa were chosen for detailed analysis of numeric characters. Other characters were scored in all available material. Selection of the ten specimens for study was based on specimen quality in terms of the amount and number of developmental stages displayed. Full variation in character states studied was included, for example, specimens with the longest and shortest leaves seen were scored.

A DELTA (Dallwitz 1980; Dallwitz et al. 1993) list of 395 characters and their states has been created by the authors for the Phyllanthae (Bruhl & Hunter unpublished). This was used to score attributes measured in selected specimens, together with those measured in all available material.

Fresh material was used where possible, but in most instances floral measurements were based on re-hydrated material. Mature leaves only were used for scoring leaf characters.

Terminology

For purposes of consistency across the members of the Phyllanthaceae, the perianth segments of *Sauropus* are referred to as sepals. Further developmental investigations need to be carried out to confirm this interpretation (Webster 1993, pers. comm.).

Terminology for seed surface characters follows that of Stearn (1992). A bordered hilum is indicated by a discoloured and often raised region surrounding the hilum (best seen in *Phyllanthus fuernrohrrii* F.Muell.; Hunter & Bruhl 1996, Fig. 1A, C).

Leaves are sometimes different between branches and ultimate branchlets. Those of branches are referred to as 'branch leaves' and those on branchlets as 'branchlet leaves'. Phyllanthoid branching is indicated by a reduction of the leaf that subtends a branch/branchlet to a scale-like structure, as illustrated by Webster (1970). Branch leaves exhibiting intermediate reduction in size, but still clearly laminate, are referred to as 'reduced'. Care should be taken where leaves may have fallen, to check for a leaf scar which will always be present.

Citation

Type specimens of all relevant taxa have been seen by one or both of the authors. Photographs of type specimens examined at BM and K are held at NE, together with photographs taken of type specimens on loan to NE.

Specimens are cited with collector and collector number. Locality statements are direct quotes from labels and are unmodified.

A list of all specimens studied will be deposited at NE. An INTKEY dataset for interactive identification will be made available on completion of our study of the Australian Phyllanthaceae.

Taxonomy

Sauropus anemoniflorus J.T.Hunter & J.J.Bruhl, **sp. nov.**; a omnibus congeneribus sepalis masculinis laceratis et a speciebus

Australianis androecio ex cupula in sepalis exorienti differt. **Typus:** Queensland: NORTH KENNEDY DISTRICT: Taravale near Hell Hole Creek, 0.5–1.5 km E of homestead, 22 March 1987, *Jackes* 8740 (holo: BRI[AQ450983]; specimen lower left hand side of sheet).

Monoecious herbaceous perennial, c. 0.3 m tall. Branch leaves sometimes 'reduced' in size. Branchlets persistent, angular or ellipsoid, ribbed, 10.5–12.5 cm long, 0.7–0.8 mm wide, glabrous, sometimes papillose. Stipules persistent, free, lanceolate to ovate to triangular, 0.5–0.8 mm long, cream or green, with bases truncate to obtuse, with apices acute to obtuse, membranous to chartaceous, with entire margins, papillose. Petioles 0.3–0.7 mm long, 0.1–0.3 mm wide, papillose. Branchlet leaves alternate, distichous, jointed; laminae asymmetrical, concave, elliptical to obovate; light-green to mid-green, chartaceous to subcoriaceous, obscurely veined, papillose to scabrous, 1.5–4.7 mm long, 0.9–2.1 mm wide; bases oblique, obtuse to cuneate; apices erect, acuminate to apiculate or mucronate; margins involute. Inflorescences with flowers of both sexes, indeterminate, axillary, sessile. Bracts and bracteoles persistent, glabrous. Male flowers solitary; buds ovoid to globose; pedicels 0.3–0.7 mm long, glabrous; sepals 6, although difficult to distinguish as such due to their lacerate to erose nature, free, ascending to divergent, 0.3–0.6 mm long, 0.4–0.8 mm wide, red, fleshy, scabrous; stamens 3, 1-whorled, arising from a central cup, symmetrical, erect; filaments wholly connate, erect, terete, 0.2–0.5 mm long; anthers extrorse, ascending to erect, oblong to circular in outline, 0.3–0.4 mm long, with locules parallel. Female flowers solitary, appearing sessile at anthesis; buds ovoid to obloid to ellipsoid; pedicels in fruit 0.3–0.8 mm long, 0.1–0.3 mm wide, glabrous; sepals 6, free, 0.3–0.6 mm long, 0.3–0.4 mm wide, ovate, ascending to divergent, red-brown, chartaceous, without a distinct white margin, acute; with papillose margins; midrib branched, not raised; styles 3, free, undivided, ascending, white to green, narrow-terete, glabrous; ovary not seen. Fruit a capsule, circular, septical. Seeds c. 5.8 mm long, c. 4 mm wide. **Fig. 1.**

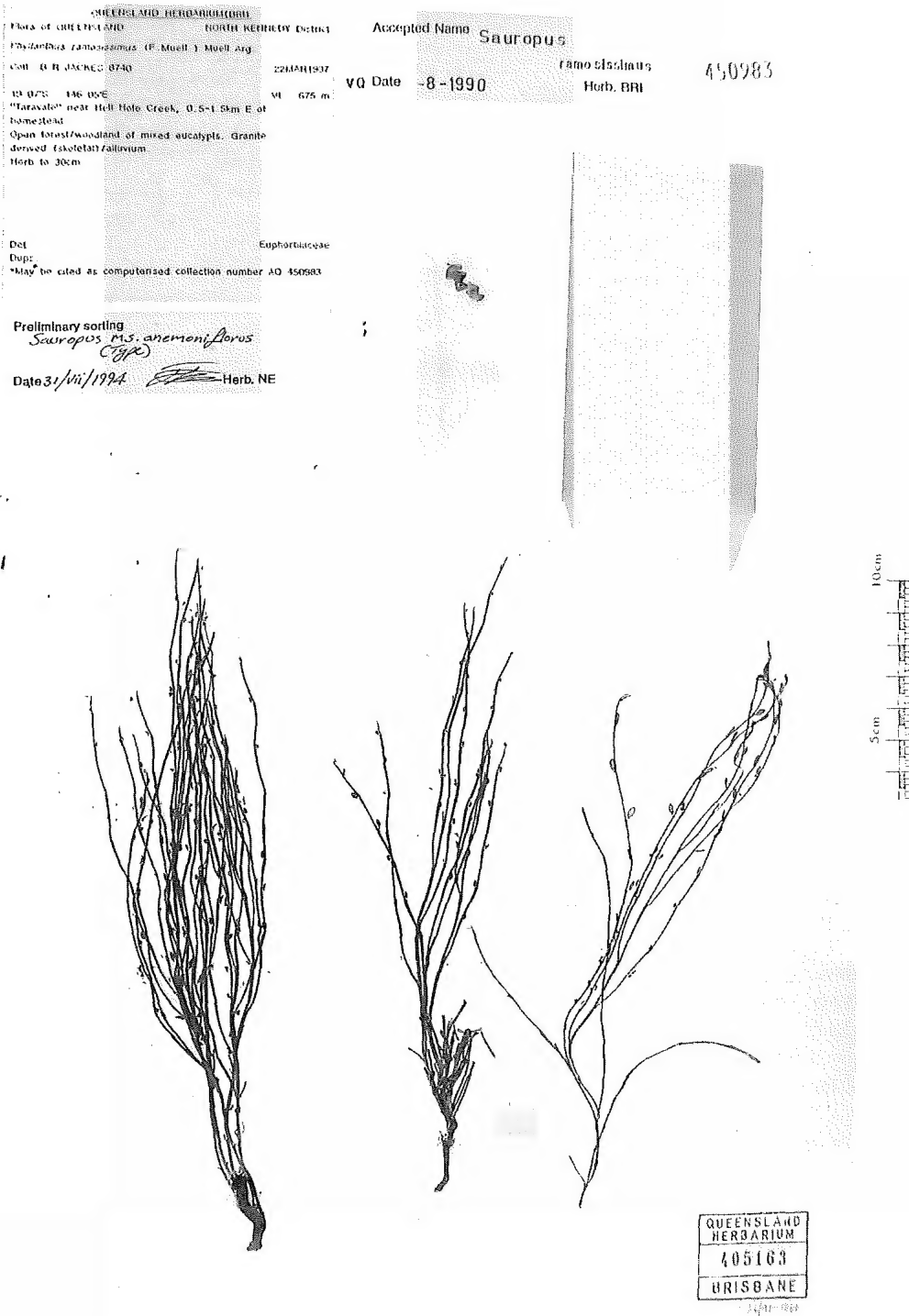


Fig. 1. *Sauropus anemoniflorus*: Photograph of holotype. (Jackes 8740, BRI).

Distribution & habitat: *Sauropus anemoniflorus* is known only from the type locality in open forest and woodland on granite derived soil.

Phenology: Flowering: March. Fruiting: March.

Specimens seen: Queensland: NORTH KENNEDY DISTRICT: Taravale near Hell Hole Creek, 0.5–1.5 km E of homestead, Jackes 8740 (BRI).

Notes: At anthesis, the androecium in *S. anemoniflorus* is barely visible, surrounded by the imbricate sepals that form a 'cup'. In Australia, this feature is only seen in one other species of *Sauropus*, *S. androgynus* (L.) Merr., which is naturalised on Christmas and Cocus (Keeling) Islands (Du Puy & Telford 1993).

Conservation status: As this species is known only from the type locality, which is on private property, an initial coding of 2VQ according to the criteria of Briggs and Leigh (1988) is suggested here.

Etymology: The specific epithet alludes to the appearance of the male flowers which somewhat resemble a sea anemone.

Sauropus aphyllus J.T. Hunter & J.J. Bruhl. **sp. nov.**; a cognate *S. ramosissimo* (F. Muell.) Airy Shaw planta non viscida et aphylla differt. **Typus:** Queensland: NORTH KENNEDY DISTRICT: Near Irvinebank, about 10 miles W of Herberton, in *Eucalyptus cloeziana*, *E. citriodora*, *E. melanophloia* community, 25 April 1967, L. Pedley 2316 (holo: BRI [AQ204798]; male specimen upper left hand side of sheet).

Dioecious herbaceous perennial. *Branch leaves* scale-like, red-brown, chartaceous, glabrous. *Branchlets* persistent, rounded, ribbed, 7.5–14 cm long, 0.6–0.8 mm wide, glabrous. *Stipules* persistent, free or fused to scale leaves, narrowly triangular to triangular, 0.4–1.6 mm long, red-brown, with bases truncate, with apices acuminate to acute, membranous, with margins entire, glabrous. *Branchlet leaves* all reduced to scales when present, alternate, distichous, brown when dry. *Inflorescences* indeterminate, axillary, sessile. *Bracts* and bracteoles deciduous, glabrous. *Male flowers* 1–2 per axil; *pedicels* 0.3–0.6 mm long,

glabrous; *sepals* 6, free, erect to ascending, 0.7–1.3 mm long, 0.6–0.8 mm wide, white to yellow and sometimes tinged pink, ovate to obovate and sometimes clawed, rounded to obtuse, membranous, glabrous; *stamens* 3, 1-whorled, symmetrical, erect to declinate; *filaments* wholly connate, erect, terete, 0.3–0.4 mm long; *anthers* extrorse, ascending, oblong to elliptical in outline, 0.2–0.5 mm long, with locules parallel to divergent. *Female flowers* solitary; *pedicels* jointed, at anthesis 0.2–0.5 mm long, 0.2–0.4 mm wide, in fruit 0.5–1.4 mm long, 0.2–0.4 mm wide, glabrous; *sepals* free, 6, at anthesis erect to ascending, in fruit ascending to divergent, white to red-brown and sometimes tinged pink, sometimes with a distinct white margin, obtuse to acute, membranous, glabrous, 0.9–1.8 mm long, 0.5–1.2 mm wide, elliptical, ovate to obovate, midrib unbranched; *styles* 3, divided for about half their length or less, erect, ascending to divergent, white to green, 0.3–0.8 mm long, 0.2–0.4 mm wide, clavate to narrow-terete, glabrous, branches entire, clavate to linear, with stigmatic surface papillate; *ovary* 0.3–1 mm long, 0.6–1 mm wide, ovoid to ellipsoid, smooth, glabrous. *Fruit* a capsule, ovoid to ellipsoid, septicial, 2.5–4.8 mm long, 2–4 mm wide, yellow-brown to green, crustaceous, smooth, glabrous, grooved septicially, apex obtuse; *column* persistent, angular-ovoid, 1.2–2.1 mm long. *Seeds* red-brown, crescentiform, laterally compressed, 3–3.6 mm long, 1.7–2.1 mm wide, prominently rugose to ruminant; *hilum* markedly depressed, bordered, circular to ovate, with cavity basal. **Fig. 2.**

Distribution & habitat: *Sauropus aphyllus* is restricted to the Dimbulah–Herberton–Ravenshoe area of north Queensland. It has been found on open rocky slopes in savannah woodland between 580–800 m altitude.

Phenology: Flowering: January, April, May, and June. Fruiting: January, April, May, and June.

Specimens seen: Queensland: COOK DISTRICT: Spring Mount Station, about 13 km from Mareeba–Dimbulah road on the road to Collins weir, Clarkson 4647 (BRI); 1 km from Lappa, Junction on road to Petford, Clarkson 4249 (QRS). NORTH KENNEDY DISTRICT: Near Irvinebank, about 10 miles W of Herberton, Pedley 2316 (BRI, type); road from Herberton to Irvinebank, van der Werff 11541 (QRS);

COLLEGE AND HERBARIUM DEPARTMENT
UNIVERSITY OF CALIFORNIA, LOS ANGELES

Accepted Name: *Sauropus* 204738
Date: 8-1990
Herb. BRI

Phyllanthus ramosissimus (P. Poell.) Buell, Arg.
Date: 8-1990
Herb. BRI

Near Irkutsk, ca. 40 miles W of
Herberton in *Eucalyptus cloeziana*,
E. altilobum, *E. melanophloea* community.

L. Pedley 2316 25 April 1967 Date: 11/11/99 Herb. NE

Erect perennial to 1 ft.

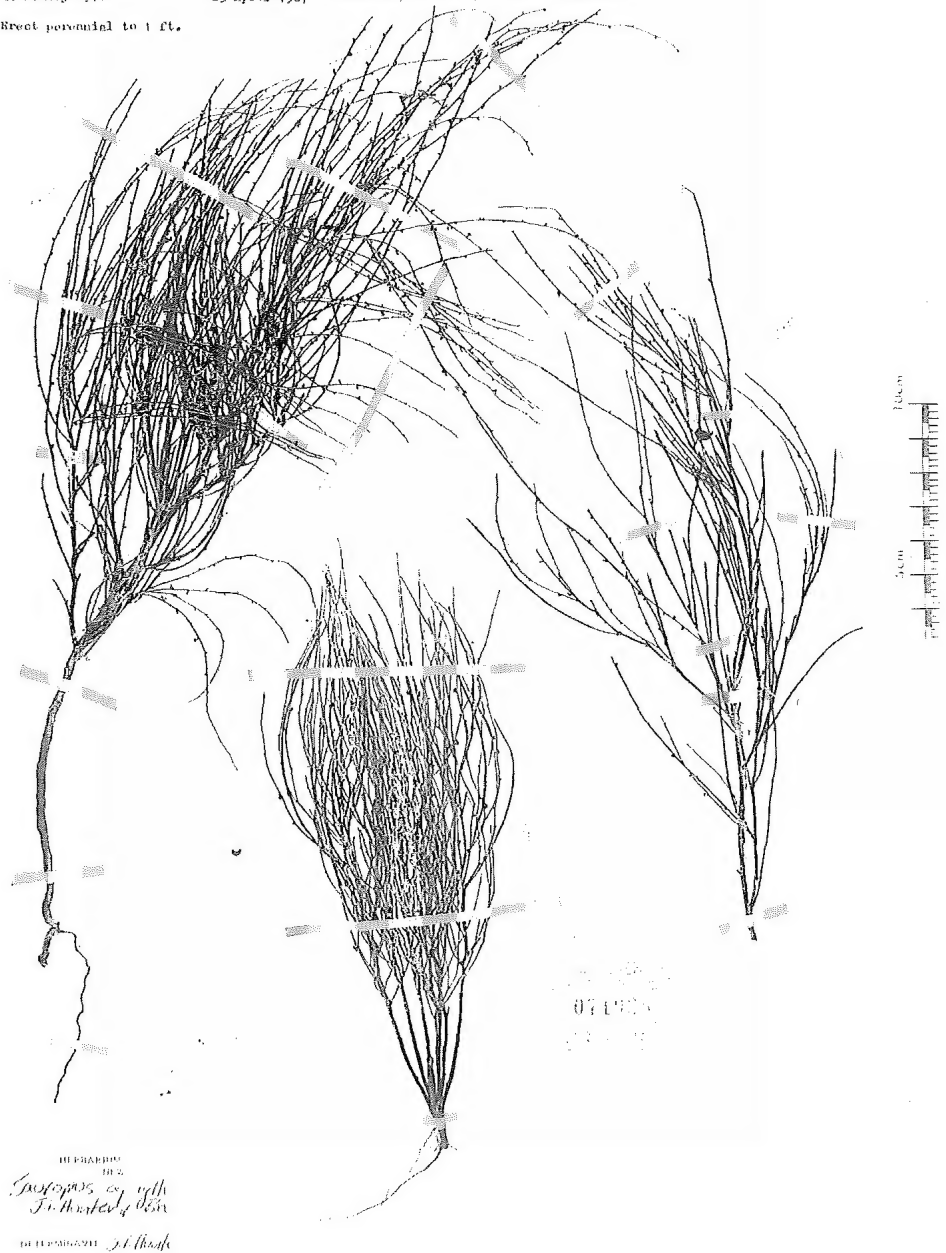


Fig. 2. *Sauropus aphyllus*: Photograph of holotype. (Pedley 2316, BRI).

along road from Watsonville to Irvinebank, *van der Werff* 11618 (QRS); Innot Hot Springs, about 30 km W of Ravenshoe, *van der Werff* 11682 (QRS); Innot Hot Springs, about 30 km W of Ravenshoe, *van der Werff* 11676 (QRS).

Notes: Leaves on plants of this species are all scale-like. Other species of *Sauropus* are known to have scale-like branch leaves (i.e. possess Phyllanthoid branching; see Webster 1970), but none of these species exhibit this reduction in leaves on branchlets as well. *Sauropus aphyllus* differs from the superficially morphologically similar *S. ramosissimus* in that all leaves of *S. aphyllus* are reduced to scales, male sepals are free, and no part of the plant is viscid. By contrast, plants of *S. ramosissimus* possess laminate branchlet leaves, male sepals that are connate for most of their length, and leaves and branchlets that are viscid.

Conservation status: Because of the restricted distribution and paucity of known specimens, most of which are from a single collector, we suggest an initial ROTAP coding of 2EQ according to the criteria of Briggs and Leigh (1988).

Etymology: The specific epithet alludes to the leafless nature of plants of this species.

Sauropus convallarioides J.T.Hunter & J.J.Bruhl. **sp. nov.**; a cognate *S. hirtellus* (Muell. Arg.) Airy Shaw planta monoecia et foliis ramorum squamosis differt. **Typus:** Queensland. COOK DISTRICT: South Pap, Tozer Gap area, Cape York Peninsula, 16 September 1983, *D.L. Jones* 1244 (holo: BRI [AQ452404]).

Monoecious perennial shrub, 0.2–0.4 m tall. Branch leaves scale-like, white, membranous, glabrous. Branchlets persistent, rounded, 2.5–4.5 cm long, 0.4–0.7 mm wide, glabrous. Stipules persistent, free, triangular, bases truncate to rounded, 0.4–0.8 mm long, cream, with apices acute, membranous, with margins entire, glabrous. Petioles 0.6–1.5 mm long, 0.2–0.7 mm wide, glabrous. Branchlet leaves alternate, distichous, jointed, brown when dry or remaining green; laminae asymmetrical, plane, 7.3–23.6 mm long, 2.7–15.5 mm wide, elliptical to obovate, light-green to mid-green, paler below, sub-coriaceous, abaxially pinnately veined, glabrous; bases oblique, rounded to

obtuse; apices erect, obtuse to rounded, mucronate to apiculate; margins revolute to plane, thickened; midrib abaxially raised with 3–7 lateral parallel veins. Inflorescences with male and female flowers mixed proximally while females flowers occur alone distally, indeterminate, axillary, sessile. Bracts and bracteoles persistent, glabrous. Male flowers 1–10 per axil; buds ovoid to barrel-shaped; pedicels 1.5–3 mm long, glabrous; sepals 6, connate shortly or for half their length, ascending to divergent, 1.5–3.6 mm long, 0.9–1.8 mm wide, white, elliptical to ovate, rounded to obtuse, fleshy, glabrous; stamens 3, 1-whorled, symmetrical, erect; filaments wholly connate, erect, terete, c. 0.5 mm long; anthers extrorse, erect, oblong to linear in outline, c. 1 mm long, with locules parallel; apiculum c. 0.1 mm long, cream. Female flowers solitary; buds conical, obloid to ellipsoid; pedicels jointed, at anthesis 1.5–4.5 mm long, 0.2–0.5 mm wide, in fruit 4.3–6.2 mm long, 0.3–0.6 mm wide; sepals free, 6, elliptical to obovate, at anthesis 1.8–5.5 mm long, 1.4–2.4 mm wide, erect to ascending, in fruit 5–6 mm long, 1.9–2.7 mm wide, erect, ascending to recurved, white, rounded to obtuse, fleshy, glabrous; styles 3, free, undivided or merely notched, ascending to recurved, white, 0.4–1 mm long, 0.2–0.3 mm wide, clavate to obloid, glabrous; ovary 1–1.2 mm long, c. 1 mm wide, ovoid to ellipsoid, smooth, glabrous. Fruit a capsule, ovoid to ellipsoid, septicidal, 5.2–5.6 mm long, 5.5–5.8 mm wide, green, cartilaginous, smooth, glabrous, grooved septicidally, apex rounded to obtuse; column persistent, angular-ovoid, 2–2.1 mm long. Seeds yellow-brown to pallid-brown, crescentiform, laterally compressed, c. 4.6 mm long, c. 2.5 mm wide, smooth; hilum slightly depressed, ovate to elliptic, with cavity central. **Fig. 3.**

Distribution & habitat: *Sauropus convallarioides* is known only from heath communities in the Iron Range area including Mt Tozer, Cape York Peninsula in north Queensland.

Phenology: Flowering: July, August and September. Fruiting: August and September.

Specimens seen: Queensland; COOK DISTRICT: 4 km NW of Mt Tozer, Iron Range, *Briggs* 7329 (NSW); South Pap, Tozer Gap area, Cape York Peninsula, *Jones* 1244 (BRI, type); 17 km NE of Browns Creek towards Iron Range, 189

QUEENSLAND HERBARIUM (BRI)
Flora of QUEENSLAND
Phyllanthus
Coll. D.L. JONES 1244
12 43'S 143 13'E
South Pap, Tozer Gap area, Cape York Peninsula
Dense moist forest bordering on rainforest.
Straggly shrub c 40cm tall, leaves dark green,
flowers white

COOK District

16SEP1983

alt. m

HERBARIUM OF THE UNIVERSITY OF
NEW ENGLAND (NE)
Sauropus convallarioides
J.T. Hunter & Bruhl (Type)
DETERMINAVIT JTH 6/20/1995

Det. Euphorbiaceae
Dups.
*May be cited as computerised collection number AQ 452404

Accepted Name
Phyllanthus sp. n. (aff. *ochrophyllus*)
Date 6/4/98 Herb. BRI

Preliminary sorting
Sauropus sp. n. (aff. *ochrophyllus*)
Date J.S. 12.2.98 Herb. BRI

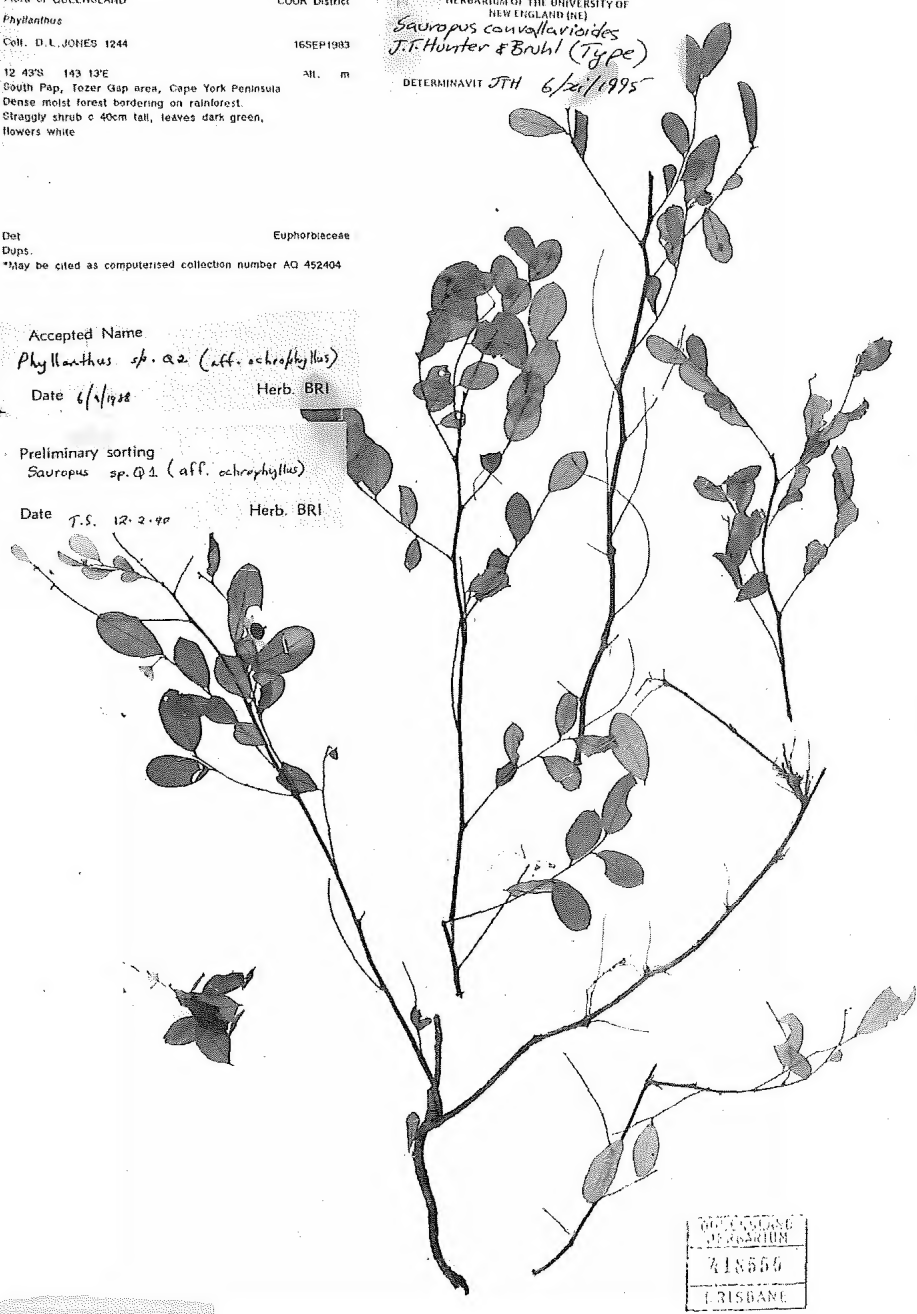


Fig. 3. *Sauropus convallarioides*: Photograph of holotype. (D.L. Jones 1244, BRI).

km N of Coen by road, *Coveny 7137 & Hind* (NSW); Tozer Gap, Tozer Range [sic], *n.d. Brass 19415* (CBG).

Conservation status: Because of the restricted distribution and habitat of this species, an initial ROTAP coding of 3VCQ according to the criteria of Briggs and Leigh (1988) is suggested here.

Etymology: This species has been colloquially called ‘Lily of the Valley’ while awaiting formal description. The specific epithet refers to this by stating that the species is like *Convallaria majalis* L., Lily of the Valley.

Sauropus decrescentifolia J.T.Hunter & J.J.Bruhl. **sp. nov.**; similis *S. elachophyllo* (F.Muell. ex Benth.) Airy Shaw a qua foliis caulinis planis, in amplitudine e basi usque apicum decrescentibus differt. **Typus:** Queensland. COOK DISTRICT: about 38 km S of Mutchilba towards Stannary Hills, *Conn & De Campo 1240* (holo: MEL).

Diocious shrub with a woody taproot, 0.05–0.3 m long. *Branchlets* persistent, rounded to ellipsoid, 2–6 cm long, 0.35–0.7 mm wide, smooth or papillose, glabrous to antrorsely scabrous. *Stipules* persistent, free, narrowly triangular to triangular, 0.3–1.2 mm long, cream when fresh and red-brown to black when dry, with bases cordate, with apices acuminate to acute, chartaceous, margin entire or erose, glabrous. *Branch leaves* laminate. *Petioles* 0.3–1 mm long, 0.3–0.6 mm wide, glabrous or with persistent indumentum. *Branchlet leaves* alternate, distichous, jointed, brown when dry; slightly asymmetrical, plane to concave, elliptical, obovate to oblanceolate, 4–21 mm long, 0.7–11.5 mm wide, light-green to mid-green when fresh, sub-coriaceous, very wrinkled when dry, obscurely veined, sometimes papillate, glabrous or scabrous; bases slightly oblique, rounded to obtuse; apices erect, acute, obtuse to rounded, mucronate to apiculate; margins plane, thickened. *Inflorescences* indeterminate, axillary, sessile. *Bracts and bracteoles* deciduous, glabrous. *Female flowers* solitary; *buds* ovoid, globose, obloid to ellipsoid; *pedicels* jointed, at anthesis 0.8–1.7 mm long, 0.3–0.7 mm wide, in fruit 1.4–2 mm long, 0.3–1 mm wide, ± distally dilated, glabrous or

sometimes indumented; *sepals* free, 6, elliptical to oblanceolate, 1.2–2.3 mm long, 0.4–1.2 mm wide, possessing inter-sepalary stipules, at anthesis erect, divergent to recurved, in fruit divergent to recurved, white to green when fresh and turning grey on drying, rounded to obtuse, fleshy, glabrous; *styles* 3, free on opposing sides of the ovary, undivided or notched, erect to divergent, white to green when fresh and turning grey when dry, 0.6–1 mm long, 0.3–0.5 mm wide, clavate, glabrous; stigmatic surface papillate; *ovary* 0.5–1.1 mm long, 0.3–1.4 mm wide, ovoid to ellipsoid, smooth, glabrous. *Fruit* a capsule, ovoid, septicidal, 9.5–11.5 mm long, 6–7 mm wide, red-brown to green, smooth, glabrous, grooved septicidally, apex rounded to obtuse; *column* persistent, angular-ovoid, 2.9–4 mm long. *Seeds* yellow to red-brown, prismatic to falcoid, laterally compressed, 3.8–5.2 mm long, 2–2.8 mm wide, smooth, with a minor marginal wing; *hilum* slightly depressed, elliptic, cavity more or less basal. **Fig. 4.**

Distribution & habitat: Only three collections of *S. decrescentifolia* are known and these are all from the Herberton–Irvinebank area in north Queensland. They were collected in savannah woodland.

Phenology: Flowering: April. Fruiting: April.

Specimens seen: Queensland: COOK DISTRICT: about 38 km south of Mutchilba towards Stannary Hills, *Conn & De Campo 1240* (MEL, type). NORTH KENNEDY DISTRICT: on Silver Valley road, 3.4 km from Mt Misery, *Forster 3973* (BRI); road from Herberton to Irvinebank, *van der Werff 11540* (QRS).

Notes: *Sauropus decrescentifolia* is very similar to *S. elachophyllus* (Benth.) Airy Shaw and could be confused with that species. The nature of four characters can be used to separate these species. In *S. decrescentifolia* the branch leaves are not reduced to scales (no Phyllanthoid branching); the leaves decrease dramatically in size distally over the plant over a series of branches, but not over each branchlet, the leaves are only slightly asymmetrical and leaf bases are only slightly oblique, and the larger leaves are obovate with a distinct rounded to obtuse apex. By contrast, *S. elachophyllus* has scale-like branch leaves (Phyllanthoid branching), the leaves decrease in size along each branchlet but not in a single series along the length of the



Fig. 4. *Sauropus decrescentifolia*: Photograph of holotype. (Conn 1240 & De Campo MEL).

plant, the leaves are noticeably asymmetrical and the leaf bases are very oblique, only some leaves are obovate but then the apex is acute. Unfortunately, only female specimens of *S. decrescentifolia* are known at present so attributes of male organs are unknown.

Currently *Sauropus decrescentifolia* and *S. elachophyllus* are the only two species of this genus known to possess inter-sepal stipules (cf. Weberling 1989). The nature of these structures in *Sauropus* is currently under investigation and will be elaborated on in a subsequent publication.

Conservation status: Only three specimens are known of *S. decrescentifolia* and no male plants have been seen. Furthermore, its distribution appears to be very limited. We therefore suggest an initial ROTAP coding of 2EQ according to the criteria of Briggs and Leigh (1988).

Etymology: The epithet, Latin for ‘decreasing leaves’, alludes to the noticeable progressive reduction in leaf size distally on the plant. It is a plural substantive in apposition.

Key to Queensland species of *Sauropus* Blume

1. Plants dioecious 2
Plants monoecious 5
2. Leaves present and prominently wrinkled when dry; stipule bases cordate; inter-sepal stipules present on female flowers; seeds smooth and with a small wing on the margins 3
Leaves when laminate (scale-like in *S. aphyllus*), not prominently wrinkled when dry; stipule bases various but not cordate; inter-sepal stipules absent; seeds prominently rugose or ruminant, and without any wings 4
3. Branch leaves laminate; leaves decreasing dramatically in size distally on the plant, slightly asymmetrical, with base slightly oblique **Sauropus decrescentifolia**
Branch leaves reduced to scales; leaves not dramatically decreasing in size distally on plant, conspicuously asymmetrical, with base conspicuously oblique **Sauropus elachophyllus**
4. Branchlets ribbed; stipules triangular to narrowly triangular; branch leaves scale-like; branchlets leafless or with leaves reduced to scales; male pedicel 0.3–0.6 mm long; male sepals free; female pedicel at anthesis 0.2–0.5 mm long, in fruit 0.5–1.4 mm long; female sepals free; style undivided; fruit 2–4 mm wide; seeds 1.7–2.1 mm wide **Sauropus aphyllus**
Branchlets smooth; stipules ovate; branch leaves ‘reduced’ leaf-like; branchlet leaves present and laminate; male pedicel 0.9–9.8 mm long; male sepals connate; female pedicels at anthesis 0.8–6 mm long, in fruit 1.5–8.5 mm long; female sepals connate; style variously divided; fruit 4–6.7 mm wide; seeds 2.4–3.4 mm wide **Sauropus hirtellus**
5. Leaves 0.8–45 mm long; petioles 0.2–1.8 mm long; stipules without distinct margins; branchlets not winged; seeds 2.5–6.8 mm long 6
Leaves 55–115 mm long; petioles 2–5.5 mm long; stipules with a distinct white margin; branchlets winged; seeds 7–9 mm long **Sauropus micranthus**

6. Male sepals connate (sometimes shortly so in *S. convallarioides*) 7
 Male sepals free 9
7. Leaves flat; margins thickened; female sepals connate to about half their length; staminal filaments <1 mm long; seeds smooth **Sauropus convallarioides**
 Leaves concave, margins not thickened; female sepals connate for most of their length; staminal filaments >1 mm long; seeds prominently sculptured 8
8. Branchlets ribbed, not spinose; stipules triangular; female sepals connate; styles free **Sauropus ramosissimus**
 Branchlets smooth, spinose; stipules ovate; female sepals free; styles connate **Sauropus rigens**
9. Leaves flat to convex and sometimes conduplicate; female pedicels distally dilated; styles notched or divided to half way **Sauropus trachyspermus**
 Leaves flat to concave, never conduplicate; female pedicels uniform throughout; styles undivided or merely notched 10
10. Branchlet leaves <5 mm long, <2 mm wide, margins not thickened, concolourous; male sepals <1 mm long, red in colour, with margins lacerate to erose; female pedicels <1 mm long; female sepals acute, <1 mm long; anthers <5 mm long **Sauropus anemoniflorus**
 Branchlet leaves >5 mm long, >2 mm wide, with margins thickened, paler abaxially; male sepals >1 mm long, white or green in colour, margins entire; female pedicels >1 mm long; female sepals obtuse to rounded, >1 mm long; anthers >5 mm long 11
11. Plants 0.5–2 m tall; branchlets <6 cm long; stipules red-brown in colour; branch leaves only ever scale-like; branchlet leaves adaxially obscurely veined, abaxially smooth; inflorescence at least sometimes with both male and female flowers; male pedicels 1.6–10 mm long; female pedicels in fruit 8–24.2 mm long; styles 2–5 **Sauropus albiflorus**
- Plants <0.5 m tall; branchlets >6 cm long; stipules green in colour; branch leaves laminate, 'reduced' or scale-like; leaves adaxially visibly veined, abaxially papillate; inflorescence with only male or female flowers; male pedicels 0.2–1.8 mm long; female pedicels in fruit 2–4 mm long; styles 3 **Sauropus podenzanae**

Acknowledgments

The authors wish to thank the heads of the following herbaria for loan of specimens: A, AD, BM, BRI, CANB, CBG, DAV, DNA, GH, HO, K, MEL, NSW, PERTH, QRS. Thanks also to the heads of A, BM, BRI, CANB, CBG, DNA, G, GH, K, LINN, MBA, MEL, NSW, QRS for access to facilities and specimens; Frances Quinn (NE) and Grady Webster (DAV) for assistance with field

work; Grady Webster and Frances Quinn for helpful comments; Lyn Craven (CANB) and Frances Quinn for the Latin diagnoses; the director of the Queensland National Parks and Wildlife Service, for permission to collect in service areas. This project was supported by funding from the Australian Biological Resources Study.

References

- AIRY SHAW, H.K. (1980). A partial synopsis of the Euphorbiaceae-Platylobeae of Australia (Excluding *Phyllanthus*, *Euphorbia* and *Calycopeplus*). *Kew Bulletin* 35: 577–700.
- BENTHAM, G. (1873). *Flora Australiensis* vol. 6. London: L. Reeve.
- BLUME, C.L. (1825). *Bijdragen tot de Flora van Nederlandsch Indië*. Batavia: Ter Lands Drukker.
- BRIGGS, J.D. & LEIGH, J.H. (1988). *Rare or Threatened Australian Plants*. Special Publication No. 14. Canberra: Australian National Parks and Wildlife Service.
- DALLWITZ, M.J. (1980). A general system for coding taxonomic descriptions. *Taxon* 29: 41–46.
- DALLWITZ, M.J., PAINE, T.A. & ZURCHER, E.J. (1993). *User's guide to the DELTA system*. Canberra: Division of Entomology, CSIRO.
- DU PUY, D.J. & TELFORD, I.R.H. (1993). Euphorbiaceae in *Flora of Australia* 50: 260–278.
- EICHLER, H.J. (1965). *Supplement to J.M. Black's Flora of South Australia* ed. 2 Adelaide: Government Printer.
- HUNTER, J.T. & BRUHL, J.J. (1996). Three new species of *Phyllanthus* in South Australia (Euphorbiaceae: Phyllanthaceae). *Journal of the Adelaide Botanic Gardens* 17:127–136.
- STANLEY, T.D. (1983). Euphorbiaceae. in T.D. Stanley & E.M. Ross (ed), *Flora of south-eastern Queensland* 1: 406–439. Brisbane: Queensland Department of Primary Industries.
- STEARNS, W.T. (1992). *Botanical Latin*. 4th Ed. Melksham: David & Charles.
- WEBERLING, F. (1989). *Morphology of flowers and inflorescences*. Cambridge: Cambridge University Press.
- WEBSTER, G.L. (1956). Studies of the Euphorbiaceae, Phyllanthoideae. II. The American species of *Phyllanthus* described by Linnaeus. *Journal of the Arnold Arboretum*. 37: 1–14.
- (1970) A revision of *Phyllanthus* (Euphorbiaceae) in the continental United States. *Brittonia* 22: 44–76.